DQO Step				
	Medium:	***Soil and Fill on Southern Parcels (and potentially beyond the Southern Parcels)***		
	Investigation Phase:	***Phase 1A***	***Phase 1B***	***Phase 2***
	Investigation Item:	***Comparison to Residential and Industrial Soil Criteria and Site-Specific Risk Values***	***Comparison to Background Reference Conditions***	***Additional sampling (if necessary) to develop risk assessment exposure estimates***
1	***State the Problem***			
	i) Problem description	Insufficient soil quality data exist for OU2 in order to determine: - The nature and lateral and vertical extent of the fill material. - The nature and extent of contaminated soil.	- Insufficient soil quality data exist for OU2 in order to determine whether potential soil contamination is from the Site or from off-Site sources.	If soil or fill containing contaminants at concentrations greater than screening values and background reference conditions is found in Phases 1A and 1B for Southern Parcels, there may still be insufficient data to establish the presence or absence of direct contact, ingestion, and inhalation risks to receptors via soil and/or fill exposure pathways.
	ii) Planning team	See note at bottom		
	iii) Conceptual model	Fill was placed in a portion of the southern parcels. The fill includes but may not be limited to CDD. The fill may contain contaminants. OU2 soil may have site-related contaminants from wind-blown deposition, run-off, groundwater leaching and redepositing of contamination, (regrading?...) - Contaminants in soil may pose a risk to receptors via the direct contact, inhalation and ingestion pathways. Cover material at the Site is limited or non-existent, which could lead to erosional run-off of contaminants towards the Quarry Pond - Infiltrating precipitation can cause contaminants in soil and fill to migrate downwards, ultimately impacting groundwater. -Groundwater migrating from OU1 could deposit contaminants in the soil and/or fill of OU2.		
	iv) General intended use for data	The soil and fill data collected will be compared to USEPA Residential and Industrial Soil Regional Screening Levels (RSLs) to identify direct contact/ingestion/inhalation risks associated with soil and fill in OU2. The data collected will ultimately be used in the Remedial Investigation Report and Baseline Risk Assessment for OU2.	The data collected from sampling locations in the Southern Parcels will be compared to background conditions, to determine if there are measurable levels of Site-related contaminants. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The collected data will be used to generate exposure estimates for an assessment of direct contact/ingestion/inhalation risks and risks to ecological receptors. The data collected will ultimately be used in the Baseline Human Health Risk Assessment and Ecological Risk Assessment for OU2.
	v) Resources, constraints, deadlines	Sufficient resources will be committed to sample soil on the Southern Parcels under the OU2 RI/FS work plan. Sampling may be postponed due to flooding.		

2 ***Goals of the Study:***

i) Primary study question	Do soil and fill samples from the Southern Parcels contain contaminants at concentrations greater than industrial or residential soil screening levels?	Are contaminant concentrations due to Site activities or locally occurring background concentrations?	Does soil or fill in OU2 contain Site-related contaminants that pose unacceptable human health risks or unacceptable risks to ecological receptors?
ii) Alternate outcomes or actions	- If sampling demonstrates that contaminant concentrations in soil and fill are less than risk-based screening levels/criteria, no further sampling or remedial action is planned. - If sampling demonstrates that contaminant concentrations in soils or fill are greater than screening levels/criteria, further evaluation is needed to determine if the contamination's is site-related, the risk to human health and the environment, and/or remedial measures.	- If sampling demonstrates that contaminant concentrations in OU2 are not greater than those found in background reference soils, no further sampling is planned.	- If sampling demonstrates that human health and ecological risks from all combined exposure pathways are acceptable, no further action is required. - If sampling demonstrates unacceptable human health or ecological risks, further evaluation, risk management and/or remediation would be required.
iii) Type of problem (decision or estimation)[1]	Decision (Action Level)	Decision (Action Level)	Estimation
iv.a) Decision statement	Determine whether any contaminant concentrations in soil and fill are greater than USEPA Industrial or Residential soil RSLs in OU2.	Determine whether any measurable levels of Site-related contaminants, relative to background reference conditions, occur in soil and fill in OU2.	Determine where contaminant concentrations require further consideration or response action, and where no further investigation is necessary.
iv.b) Estimation statement & assumptions	--	--	The parameter of interest is the mean (for estimating direct contact/ingestion/inhalation risks) of soil/fill contaminant concentrations within identified exposure areas in OU2. The statistical measure of interest is the 95% UCL of the mean for each exposure unit. The size and location of each exposure unit should be identified based on property ownership boundaries and current and reasonably foreseeable activities and land uses.

3 ***Identify Information Inputs:***

i) Information types needed	-Identification and chemical analysis of fill in OU2. - Contaminant concentrations in soil in OU2. -Background soil contaminant concentrations. - Soil samples will be collected on a random basis (random oriented grid) from each exposure area. - Soil samples will also be collected at data gap locations or areas of suspected soil contamination. -Exposure areas, determined by current and reasonably foreseeable activities land uses, exposure routes, and property ownership boundaries.	- Supplemental analyses of soil samples obtained to fill in significant data gaps across the exposure area. -Exposure routes and receptors -Toxicological information on the contaminants of concern.
ii) Information sources	- Existing soil/fill data - New results from all soil and fill samples collected from OU2, and data on background conditions.. Conceptual site model.	- New soil/fill data from the Phase 2 investigation - Available validated previous data (e.g., from Phase 1), within the exposure area.
iii) Basis of Action Level	Action Levels are: - USEPA Industrial and Residential Soil RSLs The data collected will be compared against USEPA Residential and Industrial Soil Regional Screening Levels (RSLs) to identify risks associated with soil samples from OU2.	--
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).	

4 ***Define the Boundaries of the Study:***

i) Target population, sample units	The initial target population is surficial and subsurface soils on the Southern Parcels. The sampling units are individual samples.	The sampling units are individual samples collected from the soil off-Site (beyond the southern parcels).	Target population is soil and fill exceeding screening levels and comprising the exposure units for assessment of exposure risks for human receptors.

ii) Specify spatial boundaries	The spatial boundaries are the limits of site-related soil and fill contamination. Surficial soil is to a maximum depth of 2 ft bgs for human health risk purposes, and 3 ft bgs for ecological risk. The spatial boundaries of the sub-surface soil samples for screening human health risks will be to a depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. There is no predetermined maximum depth for characterizing the extent and magnitude of contamination. [Per the groundwater DQO in Table 3.2, additional unsaturated soil samples will be collected at depths greater than 15 ft bgs to investigate potential leaching threats to groundwater.] Boreholes will be advanced up to 5 ft into native material, to the base of landfill waste, the water table, or until refusal.	Background reference surface and subsurface sampling locations will be identified in areas outside a reasonable zone of potential influence (via surface runoff or substantial airborne dust deposition) for the Site. Distance from the Site and prevailing wind directions will be considered in making this determination.	The spatial boundaries are the limits of OU2, which is everywhere that environmental media have been impacted by Site contaminants outside of OU1. Surficial soil is to a maximum depth of 2 ft bgs. The spatial boundaries of the sub-surface soil samples will be to a maximum depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. [Per the groundwater DQO in Table 3.2, the spatial boundaries to evaluate risks to groundwater will be the entire depth of soil above the water table.]
iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on the exposure assumptions of the Action Levels.		
iv) Identify any other practical constraints	Practical constraints anticipated for sampling of OU2 soil and fill include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels.	If different surficial soil substrates are encountered (e.g., silt vs. sand vs. clay), these differences may require additional sampling (e.g., further reference samples) to appropriately evaluate potential Site-related impacts. Off-Site sampling may be restricted by permission of property owners, and availability of suitable locations for background locations.	Practical constraints anticipated for sampling of Southern Parcels soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Off-Site sampling, if required for delineation purposes, may be restricted by permission of property owners.
v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis.	Comparisons to background reference conditions will be carried out on an individual-location basis.	--
v.b) Scale of estimates	--		The scale of the exposure estimate is to be identified in a Site-specific risk assessment.